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(54) **Trim removing apparatus associated with a cutting-off machine for the formation of small rolls of toilet paper or the like**

Vorrichtung zur Separierung von Abfall beim Schneiden von Papierrollen aus einer langen Stange

Dispositif pour éjecter des déchets pour une machine de coupe des rouleaux de papier de toilette

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## Description

The invention refers to an apparatus for the removal of trims and other scraps from small rolls of web material such as toilet paper, all-purpose wipers and other articles produced by cutting rolls or logs with spaced-apart cuts, said apparatus comprising roll feeding means for advancing rows of small rolls and trim discharging means for eliminating trims or scraps.

An earlier apparatus for removing trims or scraps from logs of web material which have previously been cut into rows of rolls with trims or scraps at the longitudinal ends of the rows is shown in the German patent DE-B-3 409 504. This apparatus is provided with a conveyor for a double row of small rolls, subsequent rows of rolls being advanced in their longitudinal direction towards the conveyor, the conveyor comprising two lower, spaced apart, smooth guide belts and an upper chain, the latter being located between the belts and carrying a set of log-supporting elements. Each roll rests on one of the lower belts and on one of the upper support elements. The chain-borne support elements are disposed at regular intervals corresponding to the length of the small rolls being produced, thereby causing each small roll to correspond to a support element. At pre-determined positions along the chain, one of the support elements is missing, so as not to provide the small roll with upper support in correspondence of this interruption. By positioning this interruption in correspondence of the position taken up by the leading and trailing trims, respectively, of two subsequent logs, these trims fall down due to lack of upper support.

This apparatus is very reliable and efficient, but has the drawback of a considerable length and a certain complexity, as far as the adaptation of the apparatus to different lengths and diameters of the logs are concerned.

The object of the present invention is a new type of apparatus for the removal of trims and other scraps from small rolls cut out from logs of web material. This object is achieved with the apparatus of claim 1 or 2.

According to the present invention, the apparatus includes at least a continuous flexible member with apertures arranged along its longitudinal development, and pneumatic suction means cooperating with said continuous flexible member. Said flexible member receives the rolls from a roll feeding means, suspends said rolls therefrom by means of the vacuum operated by said pneumatic suction means through said apertures, and moves said rolls away from said roll-feeding means. The flexible member contacts the rolls in correspondence of the upper portion of their cylindrical surface.

In a particularly advantageous embodiment, said pneumatic suction means includes a suction box with a bottom and at least one row of ports or a longitudinally extending slot in said bottom. Said flexible member slides along and in contact with the outer surface of said bottom, along said row of ports or said slot.

In the apparatus of claim 1, a longitudinally extending portion of said flexible belt has no apertures; and the advancing movement of said flexible belt is synchronized with the motion of said roll-feeding means, in order that during said motion said portion of the flexible belt corresponds with the interval between the end of a row of rolls formed from one log and the beginning of the subsequent row of rolls formed from the subsequent log.

This apparatus is of particularly simple construction and can be easily suited to any length of log by simply increasing or decreasing the region without apertures of the continuous flexible belt. The length of the suction portion, i.e., of the region provided with apertures, corresponds substantially to the length of the log, excluding the length of the trims, while the length devoid of apertures allows the discharge of the leading and trailing trims of each log.

The adaptation of the apparatus to different lengths of logs may take place by applying adhesive tape of suitable length, or similar means, across selected apertures of the continuous flexible belt.

The feeding speed of the flexible belt may be uniform and equal to the average speed of the small rolls being cut. Conversely, it is also possible to provide for a variation of the feeding speed of the flexible belt and, in particular, an acceleration thereof, when the portion of said belt without apertures travels below the suction box. This facilitates the discharge of the trims and the passage of the log pushing members which push the rolls cut out from the log.

Further advantageous features of the apparatus according to the invention are set forth in the following disclosure. In particular, the continuous flexible belt may be formed either by a single member having longitudinally distributed apertures, or even by a pair of members extending parallel and at some distance from each other so as to define a suction interspace. Longitudinal flexible continuous edges may be provided at the side of either the interspace or the apertures (in the case of a single tape-like member). Said edges are intended to contact the surface of the small rolls and ensure a vacuum-tight seal and thus a correct retention of the individual small rolls.

With the above and other objects in view, more information and a better understanding of the present invention may be achieved by reference to the following detailed description.

## DETAILED DESCRIPTION

For the purpose of illustrating the invention, there is shown in the accompanying drawings a form thereof which is at present preferred, although it is to be understood that the several instrumentalities of which the preferred form of the invention consists can be variously arranged and organized and that the invention is not limited to the precise arrangements and organizations of the instrumentalities as herein shown and described.

In the drawings, wherein like reference characters indicate like parts:

Figs. 1-6 show schematically six steps of a cycle for the removal of trims at the end of one stick or log and at the beginning of the subsequent stick or log. Fig. 7 is a greatly enlarged cross-section taken on line VII-VII of Fig. 1.

Fig. 8 is a still large cross-section of the belt-member of Figure 7.

Fig. 9 is a cross-section taken on line IX-IX of Fig. 8 showing the shape of a portion of the belt-member perforations.

Fig. 10 shows a side view.

Fig. 11 shows a section on line XI-XI of Fig. 10.

Fig. 12 shows a modified embodiment of the invention.

Referring now to the drawings, numeral 1 indicates a continuous belt-like carrier which advances logs to be cut (as well as the rows of small rolls R cut from the logs) being discharged from a rewinder (not shown) of a paper converting line which forms the small rolls of toilet paper, all-purpose wipers and other similar articles. This continuous carrier 1 is driven by wheels (which may be toothed gears if the belt is a chain-belt), one of which is shown at 3. The continuous carrier 1 has a plurality of pushers 5 which are spaced apart by an extent which corresponds substantially at least to the length of the logs, i.e., to the length of a row of small rolls R which are cut out of a log.

As it is known, the cutting of a stick or log for the formation of small rolls R produces also some scrap, so-called trims, indicated by RF, both at the forward end of a row of small rolls R and at the rear end thereof. These trims RF must be separated from the small rolls R so as to prevent such trims from interfering with the subsequent handling and packaging of the small rolls. The present invention allows the removal of the trims RF from a line of rolls R.

In the schematic drawings of Figs. 1 to 6, numeral 7 indicates a support on which a row of small rolls R, cut out of a log, can slide. The support has a longitudinal recess in which the pushers 5, which move forward in the direction of the arrows shown in the drawing can move. The support 7 terminates just ahead of the wheel 3. After the rolls R leave the support 7, they are supported and moved forward by a different means where the removal of the trims RF takes place between the end of the support 7 and the leading edge of a second conveyor 9. The apparatus of the present invention allows the trims RF to be removed by letting them fall into the empty space between the conveyors 7 and 9 while the rolls R are prevented from falling between the conveyors.

Referring again to Figs. 1 to 6, numeral 12 indicates a continuous belt with inwardly extending teeth 12A (similar to a timing belt), which travels between two transmission wheels 14, 16, one of which is a driving

wheel. The driving wheel may be operated either by a mechanical drive which is kinematically connected to the feeding means made up of wheels 1, 3, or may be operated independently by an electronically controlled motor 2 for the purposes to be indicated hereinafter.

The continuous belt 12 is guided along its lower travel by two side guides 17 which support the longitudinal edges of the belt 12, as shown in detail in Fig. 7. The main elements of these side guides 17 are indicated by 18 and 20 and consist of plates made of a material having low co-efficient of friction, to allow an easy sliding of the toothed belt 12.

Between the guides formed by the plates 18 and 20, and also between the teeth 12A, the toothed belt 12 is provided with perforations 22. These perforations are flanked in the outer sides of the belt 12 by two elastically yielding side lips 24, which extend continuously along the entire length of the belt 12.

The guides 17 may be longitudinally split in two parts or may be longitudinally separated, as shown at 20A, so as to provide passages which are aligned with passages 26 formed in the lower part 28 of a suction box 30 located between the two transmission wheels 14, 16 above the lower portion of the belt 12. As a result of vacuum established inside the box 30, a suction is created through the passages 26 and 20A and through the perforations 22 between the side lips 24 of the lower portion of the toothed belt 12.

A longitudinally-extending section 12Z of the toothed belt 12, between two spaced-apart points 12X and 12Y, is devoid of perforations 22. (See Figs. 1-6). This portion 12Z extends a distance which is slightly greater than the inter-space between the rear part of the last roll RU of a row of small rolls, and the front part of the first roll RP of a following row of rolls cut out of a subsequent log. The trims RF are located within this inter-space, between the small rolls RU and RP. These trims, therefore, are between the last roll of the first row of complete rolls and the first roll of the following complete row of rolls, respectively, as shown in Fig. 1.

Because the logs are wound from parent-rolls of different width, during manufacture of the logs, a variation of the above-mentioned interspace may take place. Therefore, the length of the region 12Z without holes may be modified by applying suitable closing means in the central perforated region of the belt 12. This modifies the location of the leading and/or trailing points 12X, 12Y of the portion 12Z. The closing may be provided by an adhesive tape or similar means.

During advance of a log on the conveyor 1, and just before reaching the terminal region of the support to 7, the small rolls R come into contact with the underside of the continuous belt 12, just downstream from the transmission wheel 16. Here they come into contact with the resilient lips 24 of said belt 12, thereby forming with the belt and the side lips a space S (Fig. 7) in which a suction is created due to the vacuum in the suction box 30, said suction exerting a retention action on the small rolls R. Accordingly, the small rolls are held by the pneumatic



action and advanced by the belt 12 until they reach the conveyor 9, the beginning of the upper section of which is upstream of the downstream end of the suction box 30. In this way, the small rolls held by the belt 12 by the vacuum, are laid down onto the conveyor 9 when the belt reaches the end of the suction box 30. The conveyor 9 moves the small rolls away, and it can also separate them, provided the speed of said conveyor 9 is higher than the speed of belt 12.

The motion of the input conveyor 1 and that of the belt 12 are synchronized in such a way that when the last small roll RU in the row, and its contiguous trim RF, reach the end of the support 7, the end 12X of the non-apertured portion 12Z also reaches said support-end. Thus the last small roll RU (as well as the previous small rolls) are retained under the belt 12 by the suction, while the trim RF meets the non-apertured portion 12Z. Because the trim RF is not held by suction, it falls down, away from belt 12, as shown in Figs. 3, 4 and 5.

It is to be understood that the belt 12 may be made of a material which is pervious to air so that a vacuum in box 30 can create a suction through the belt and act upon the rolls supported against the lips 24 in the selected areas. The apertures are in such case provided for by the belt material itself.

The terminal point 12Y of the non-pervious portion 12Z comes to substantial alignment with the first small roll RP of the next row of advancing small rolls, very close to the adjacent trim RF which precedes the first small roll RP, as shown in Figs. 3 and 4. As a result, also this initial trim adjacent the small roll RP is not affected by the suction and falls down as shown in Figs. 5 and 6, while the first small roll RP is retained by the suction beneath the belt 12 as previously explained.

As already pointed out, the conveyor 1 and the belt 12 may be driven at different speeds, i.e., the belt 12 may be driven at an average speed no less than the average speed of the conveyor 1. However, the speed of pushers 5 and the speed of belt 12 may be the same. A cyclic variation of the speed of the belt 12 may be used when the sticks or logs are relatively short with respect to the distance between the pushers 5 so as to avoid a drop in vacuum inside the box 30 caused by an uncovering of the final stretch of the previous portion of belt 12 at the end of its travel beneath the suction box 30. For this purpose, provision may be made for a temporary increase of the speed of transit of the perforated portion of the belt 12 and then a slowing down thereof, during passage below the suction box 30 of the non-perforated portion. A speed difference between belt 12 and pushers 5 (e.g. an acceleration of the belt 12) may be provided during the intermediate step (shown in Fig. 2) between one set of small rolls and the next, to allow the pusher 5 to be rotated about the wheel 3 without interfering with the last small roll being supported by the belt 12. The speed increase of belt 12 tends to project the terminal trim RF out of the pusher and, therefore, to facilitate the discharge thereof.

The varying of the speed of the belt 12 with respect

to that of the conveyor 1 may be achieved either with a speed variator (when the actuation of the belt 12 is kinematically connected to the conveyor 1) or with the provision of an independent motor 2 for driving the belt 12, and by regulating said motor according to a suitably timed operated program. In either case, the adjustment of the speed of said belt 12 can be attained with respect to that of the conveyor 1. The independent drive 2 for the belt 12 may be a motor with electronic control or a mechanical drive system with variator.

The apparatus must also be able to work effectively on logs of different diameters and, to this end, provision may be made for supporting the group, consisting of the transmission wheels 14, 16, belt 12, and suction box 30, in a vertically adjustable unit. Such a disposition is illustrated in the embodiment of Figs. 10 and 11, wherein the parts corresponding to those of Figs. 1 to 6 are designated by the same reference numbers but increased by 100. In Figs. 10 and 11 (showing a system for the advancement of three rows of small rolls with three tracks and three conveying and belt systems), a main frame 145, which supports the advancing and conveying system 101, 103, 105, includes vertical slide guides for a unit 147 capable of being adjusted in height by means, for example, of a motor-reducer 150. The slide guides being made with ball-bearings or other rolling guide systems.

The unit 147 carries the suction box 130 and the transmission wheels 114 and 116 which define the lower portion of the perforated, toothed belt 112. This belt 112 has a length greater than member 12 of Figs. 1-6 and is driven by further transmission wheels such as those shown at 114A and 116A. By suitably adjusting the unit 147 in height, there is obtained a placement of the distance between the supports 107 for the small rolls R pushed by the pushers 105 and the lower active suction-portion of belt 112. The latter being provided, also in this case, with the side lips 24 and the non-perforated portion, such as that indicated by 12Z in the first embodiment described herein.

Fig. 12 shows a further modified embodiment of the device of the present invention. Parts corresponding to those of Figs. 1-6 are referred to by the same reference numbers. In this case, the flexible belt 12 is provided with apertures (such as those designated 22 in Figs. 1-6) along its entire development, without interruptions. Between the conveyor 1 and the belt 12, a further conveyor 201 is arranged, which moves at a speed faster than the speed of conveyor 1. Consequently, the rolls R are transferred to the belt 12 in a spaced relationship, as clearly shown in Fig. 12. A sensor 203, in the form of a dual pair of electric eyes, is arranged on the frame carrying the vacuum box 30. Sensor 203 detects the length of each roll R passing through the electric eye arrangement and by means of a micro-computer 205 a signal is generated whenever the detected length is lower than a given threshold. This signal timely activates a compressed-air arrangement 207 which by means of a jet of air blows the trim from the belt 12 and onto a conveyor

209.

To make the device more reliable, a flexible sheet 211 can be provided, which causes the trims to tilt and no trim comes into contact with the belt 12.

The embodiment of Fig. 12 has the advantage that no synchronization is required between the conveyor 1 and the belt 12.

It is understood that the drawing shows an exemplification given only as a practical demonstration of the invention, as this may vary in the forms and dispositions without nevertheless departing from the scope of the invention as defined by the claims.

### Claims

1. An apparatus for removing trims or scraps (RF) from logs of web material which have previously been cut into rows of rolls (R) with trims or scraps (RF) at the longitudinal ends of the rows, said apparatus including a conveyor (1; 101) for advancing subsequent rows of rolls (R) in a longitudinal direction of the rows, the rows being spaced apart from one another by predetermined intervals between the trailing trim or scrap of one row and the leading trim or scrap of the subsequent row; wherein

- the apparatus includes a continuous flexible belt (12, 112), in which apertures (22) are provided which are arranged along the length of the flexible belt, and pneumatic suction means (30; 130) cooperating with said flexible belt (12; 112);
- said flexible belt partially overlaps said conveyor (1, 101) to receive the rolls from said conveyor (1; 101) and to hold said rolls beneath said belt by means of the pneumatic suction created by said pneumatic suction means through said apertures (22) and to move said rolls away from said conveyor (1; 101);
- and a longitudinally extending portion (12Z) of said belt (12, 112) has no apertures and the advancing movement of said belt is synchronized with the motion of said conveyor (1; 101) in such manner that during said motion said extending portion (12Z) is made to positionally correspond to the interval between the end of a row of rolls and the beginning of the subsequent row of rolls.

2. An apparatus for removing trims or scraps (RF) from logs of web material which have previously been cut into rows of rolls (R) with trims or scraps (RF) at the longitudinal ends of the rows, said apparatus including a conveyor (1, 201) for advancing subsequent rows of rolls (R) in a longitudinal direction of the rows, the rows being spaced apart from one another by predetermined intervals between the trailing trim or scrap of one row and the leading

trim or scrap of the subsequent row; wherein

- the apparatus includes a continuous flexible belt (12, 112), in which apertures (22) are provided which are arranged along the length of the flexible belt, and pneumatic suction means (30; 130) cooperating with said flexible belt (12; 112);
- said conveyor (1, 201) feeds the rolls (R) to said belt (12) in a spaced apart relationship;
- said flexible belt partially overlaps said conveyor (1; 201) to receive the rolls from said conveyor (1; 201) and to hold said rolls beneath said belt by means of the pneumatic suction created by said pneumatic suction means through said apertures (22) and to move said rolls away from said conveyor (1; 201);
- and a sensor means (203) is associated with said belt (12), said sensor means (203) detecting the length of each roll (R) moved by said belt, trim discharging means (207) being arranged downstream of said sensor means, with said discharging means being activated each time the sensor means (203) detects the passage of a trim or scrap.

3. Apparatus according to claim 1 or 2, characterized in that said belt operates continuously.

4. Apparatus according to any one of the preceding Claims, characterized in that the belt (12) includes two longitudinal flexible continuous lips (24) with the apertures (22) disposed between said lips (24).

5. Apparatus according to any one of the preceding Claims, characterized in that said belt (12) is formed by two spaced apart members, parallel to one another and at some distance from each other to define a suction aperture between them.

6. Apparatus according to claim 1, characterized in that said continuous belt is adjustable in position in order to phase said portion (12Z) thereof without apertures with respect to the interval between subsequent rows of small rolls.

7. Apparatus according to Claim 1 or 6, characterized in that at least a region of the portion (12Z) devoid of apertures (22) is created by applying aperture-plugging material which can be applied and removed as desired to modify, at need, the length of said portion (12Z).

8. Apparatus according to any one of the preceding Claims, characterized in that the belt (112) is carried by a vertically adjustable unit (147) able to accommodate small rolls of different diameters.

9. Apparatus according to any one of the preceding Claims, characterized in that it comprises drive means able to change the speed ratio between said conveyor (1; 101) and said belt (12; 112) in order to vary the speed of said belt (12; 112), said belt speed being not less than the average speed of the conveyor (1; 101). 5
10. Apparatus according to Claim 9, characterized in that said drive means for changing the speed ratio is an electro-mechanical means (2), and more particularly a separate electrical variable-speed motor. 10
11. Apparatus according to any one of the preceding Claims, characterized in that said belt (12; 112) is a toothed belt and is driven between at least two wheels (14, 16; 114, 116; 114A, 116A). 15
12. Apparatus according to Claim 2, characterized in that said discharging means include an air nozzle (203). 20
13. Apparatus according to Claim 2, characterized in that a trim tilting means (211) is combined with said conveyor (1; 201) to cause the trims to tilt before they reach said belt (12). 25

#### Patentansprüche

1. Vorrichtung zum Entfernen von Schnipseln oder Abfall (RF) von Bahnmaterialstangen, die vorher in Reihen von Rollen (R) mit Schnipseln oder Abfall (RF) an den seitlichen Enden der Reihen geschnitten worden sind, mit einem Förderer (1; 101) zum aufeinanderfolgenden Vorschub von Rollenreihen (R) in einer Längsrichtung der Reihen, wobei die Reihen durch vorbestimmte Intervalle zwischen dem hinteren Schnipsel oder Abfall einer Reihe und dem vorderen Schnipsel oder Abfall der folgenden Reihe beabstandet sind, sowie mit 30 35 40
- einem endlosen flexiblen Gurt (12, 112), in welchem längs seiner Länge Öffnungen (22) vorgesehen sind, sowie mit pneumatischen Unterdruckmitteln (30; 130), die mit dem flexiblen Gurt (12; 112) zusammenwirken; 45
  - wobei der flexible Gurt den Förderer (1, 101) teilweise überlappt, um die Rollen aus dem Förderer, (1; 101) aufzunehmen und die Rollen unter dem Gurt mittels pneumatischem Unterdruck zu halten, der von den pneumatischen Unterdruckmitteln durch die Öffnung (22) erzeugt wird, und die Rollen von dem Förderer (1; 101) wegzubewegen; 50 55
  - sowie mit einem sich in Längsrichtung erstreckenden Abschnitt (12Z) des Gurtes (12, 112), der keine Öffnungen aufweist, wobei die Vor-

schubbewegung des Gurtes mit der Bewegung des Förderers (1; 101) in solcher Weise synchronisiert ist, daß während der Bewegung der Abschnitt (12Z) positionsmäßig dem Intervall zwischen dem Ende einer Rollenreihe und dem Anfang der nachfolgenden Rollenreihe entspricht.

2. Vorrichtung zum Entfernen von Schnipseln oder Abfall (RF) von Bahnmaterialstangen, die vorher in Reihen von Rollen (R) mit Schnipseln oder Abfall (RF) an den longitudinalen Enden der Reihen geschnitten worden sind, mit einem Förderer (1, 201) zum Vorschub aufeinanderfolgender Rollenreihen (R) in Längsrichtung der Reihen, wobei die Reihen um vorbestimmte Intervalle zwischen dem hinteren Schnipsel oder Abfall einer Reihe und dem vorderen Schnipsel oder Abfall der folgenden Reihe beabstandet sind, sowie mit
- einen kontinuierlichen flexiblen Gurt (12, 112), in welchem längs seiner Länge Öffnungen (22) vorgesehen sind, sowie mit pneumatischen Unterdruckmitteln (30; 130), die mit dem flexiblen Gurt (12; 112) zusammenwirken;
  - wobei der Förderer (1, 201) die Rollen (R) dem Gurt (12) beabstandet zuführt;
  - und wobei der flexible Gurt den Förderer (1, 201) teilweise überlappt, um die Rollen aus dem Förderer (1; 201) aufzunehmen und die Rollen unter dem Gurt mittels pneumatischem Unterdruck zu halten, der von den pneumatischen Unterdruckmitteln durch die Öffnungen (22) erzeugt wird, und die Rollen von dem Förderer (1; 201) wegzubewegen;
  - sowie mit dem Gurt (12) zugeordneten Fühlermitteln (203), die die Länge jeder von dem Gurt bewegten Rolle (R) feststellen, sowie mit Schnipselausgabemitteln (207), die abstromseitig von den Fühlermitteln angeordnet sind und jedesmal dann aktiviert werden, wenn die Fühlermittel (203) das Vorbeilaufen eines Schnipsels oder Abfalls feststellen.
3. Vorrichtung nach Anspruch 1 oder 2, dadurch gekennzeichnet, daß der Gurt kontinuierlich arbeitet.
4. Vorrichtung nach einem der vorstehenden Ansprüche, dadurch gekennzeichnet, daß der Gurt (12) zwei longitudinale, flexible, kontinuierliche Lippen (24) aufweist, wobei die Öffnungen (22) zwischen den Lippen (24) angeordnet sind.
5. Vorrichtung nach einem der vorstehenden Ansprüche, dadurch gekennzeichnet, daß der Gurt (12)



durch zwei beabstandete Glieder gebildet ist, die sich parallel und mit solchem Abstand zueinander erstrecken, daß zwischen ihnen eine Unterdrücköffnung geschaffen ist.

6. Vorrichtung nach Anspruch 1, dadurch gekennzeichnet, daß der endlose Gurt positionsmäßig einstellbar ist, und seinen Abschnitt (12Z) phasenmäßig so einzustellen, daß bezüglich des Intervalls zwischen aufeinanderfolgenden Reihen kleiner Rollen keine Öffnungen vorhanden sind. 5 10
7. Vorrichtung nach Anspruch 1 oder 6, dadurch gekennzeichnet, daß wenigstens ein Bereich des Abschnittes (12Z) ohne Öffnungen (22) dadurch geschaffen ist, daß einsetzbares und entnehmbares Öffnungsverschlußmaterial zur gegebenenfalls erforderlichen Modifizierung der Länge des Abschnittes (12Z) eingesetzt ist. 15 20
8. Vorrichtung nach einem der vorstehenden Ansprüche, dadurch gekennzeichnet, daß der Gurt (112) von einer vertikal einstellbaren Einheit (147) getragen ist, die kleine Rollen unterschiedlicher Durchmesser aufnehmen kann. 25
9. Vorrichtung nach einem der vorstehenden Ansprüche, dadurch gekennzeichnet, daß Antriebsmittel das Geschwindigkeitsverhältnis zwischen dem Förderer (1; 101) und dem Gurt (12; 112) verändern können, um die Geschwindigkeit des Gurtes (12; 112) zu variieren, wobei die Gurtgeschwindigkeit nicht kleiner als die mittlere Geschwindigkeit des Förderers (1; 101) ist. 30 35
10. Vorrichtung nach Anspruch 9, dadurch gekennzeichnet, daß die Antriebsmittel zum Verändern des Geschwindigkeitsverhältnisses elektromechanische Mittel (2) sind, insbesondere ein separater elektrischer Motor mit variabler Geschwindigkeit. 40
11. Vorrichtung nach einem der vorstehenden Ansprüche, dadurch gekennzeichnet, daß der Gurt (12; 112) ein gezahnter Gurt ist und zwischen wenigstens zwei Rädern (14, 16; 114, 116; 114A, 116A) angetrieben ist. 45
12. Vorrichtung nach Anspruch 2, dadurch gekennzeichnet, daß die Ausgabemittel eine Luftdüse (203) aufweisen. 50
13. Vorrichtung nach Anspruch 2, dadurch gekennzeichnet, daß eine Schnipselkippvorrichtung (211) mit dem Förderer (1; 201) kombiniert ist, um die Schnipsel abkippen zu lassen, ehe sie den Gurt (12) erreichen. 55

## Revendications

1. Appareil pour éliminer les chutes ou rebuts (RF) de bobines de matériau tissé qui ont été préalablement coupées en rangées de rouleaux (R) présentant des chutes ou rebuts (RF) aux extrémités longitudinales des rangées, l'appareil comprenant un convoyeur (1, 101) pour faire avancer successivement les rangées de rouleaux (R) dans le sens longitudinal des rangées, les rangées étant espacées l'une de l'autre par des intervalles prédéterminés entre les chutes ou rebuts de la fin d'une rangée et les chutes ou rebuts de la rangée suivante, dans lequel
  - l'appareil comprend une courroie flexible continue (12, 112) dans laquelle sont ménagées des ouvertures (22) disposées sur la longueur de la courroie flexible, et des moyens pneumatiques de succion (30, 130) coopérant avec la courroie flexible (12, 112),
  - la courroie flexible déborde partiellement sur le convoyeur (1, 101) afin de capter les rouleaux du convoyeur (1, 101), de maintenir ces rouleaux en dessous de la courroie au moyen de la succion pneumatique créée à travers les ouvertures (22) par les moyens pneumatiques de succion et d'éloigner les rouleaux du convoyeur (1, 101),
  - une partie de la courroie (12, 112) s'étendant longitudinalement (12Z) n'a pas d'ouvertures et le mouvement d'avancée de la courroie est synchronisé avec le mouvement du convoyeur (1, 101) de telle sorte que durant ce mouvement la partie en prolongement (12Z) vient en position correspondant à l'intervalle entre la fin de la rangée de rouleaux et le début de la rangée de rouleaux suivante.
2. Appareil pour éliminer les chutes ou rebuts (RF) de bobines de matériau tissé qui ont été préalablement coupées en rangées de rouleaux (R) présentant des chutes ou rebuts (RF) aux extrémités longitudinales des rangées, l'appareil comprenant un convoyeur (1, 201) pour faire avancer successivement les rangées de rouleaux (R) dans le sens longitudinal des rangées, les rangées étant espacées l'une de l'autre par des intervalles prédéterminés entre les chutes ou rebuts de la fin d'une rangée et les chutes ou rebuts de la rangée suivante, dans lequel
  - l'appareil comprend une courroie flexible continue (12, 112) dans laquelle sont ménagées des ouvertures (22) disposées sur la longueur de la courroie flexible, et des moyens pneumatiques de succion (30, 130) coopérant avec la

- courroie flexible (12, 112),
- le convoyeur (1, 201) alimente la courroie (12) en rouleaux (R) en successions espacées, 5
  - la courroie flexible déborde partiellement sur le convoyeur (1, 201) afin de capter les rouleaux du convoyeur (1, 201), de maintenir ces rouleaux en dessous de la courroie au moyen de la succion pneumatique créée à travers les ouvertures (22) par les moyens pneumatiques de succion et d'éloigner les rouleaux du convoyeur (1, 201), 10
  - et des moyens capteurs (203) sont associés avec la courroie (12), les moyens capteurs (203) détectant la longueur de chaque bobine (R) déplacée par la courroie, des moyens de déchargement des chutes (207) étant placés en aval des moyens capteurs, ces moyens de déchargement étant activés à chaque fois que les moyens capteurs (203) détectent le passage d'une chute ou d'un rebut. 15 20
3. Appareil selon la revendication 1 ou 2, caractérisé en ce que la courroie fonctionne de façon continue. 25
  4. Appareil selon l'une des revendications précédentes, caractérisé en ce que la courroie (12) comprend deux lèvres continues longitudinales flexibles (24), les ouvertures (22) étant placées entre les lèvres (24). 30
  5. Appareil selon l'une des revendications précédentes, caractérisé en ce que la courroie (12) est formée de deux éléments espacés, parallèles l'un à l'autre et à une certaine distance l'un de l'autre, l'ouverture pour la succion étant disposée entre eux. 35 40
  6. Appareil selon la revendication 1, caractérisé en ce que la courroie continue est ajustable en position afin de mettre en phase la partie (12Z) sans ouvertures avec l'intervalle entre les rangées subséquentes des petits rouleaux. 45
  7. Appareil selon la revendication 1 ou 6, caractérisé en ce qu'au moins une région de la partie (12Z) démunie d'ouvertures (22) est réalisée en appliquant un matériau obturant qui peut être appliqué et retiré comme désiré pour modifier, au besoin, la longueur de cette partie (12Z). 50
  8. Appareil selon l'une des revendications précédentes, caractérisé en ce que la courroie (112) est portée par une unité ajustable verticalement (147) capable de gérer des petits rouleaux de différents diamètres. 55
9. Appareil selon l'une des revendications précédentes, caractérisé en ce qu'il comprend des moyens moteurs permettant de modifier le rapport de vitesse entre le convoyeur (1, 101) et la courroie (12, 112) de façon à faire varier la vitesse de la courroie (12, 112), la vitesse de la courroie n'étant pas inférieure à la vitesse moyenne du convoyeur (1, 101).
  10. Appareil selon la revendication 9, caractérisé en ce que les moyens moteurs permettant de modifier le rapport de vitesse sont des moyens électromécaniques (2), et plus particulièrement un moteur électrique à vitesse variable séparé.
  11. Appareil selon l'une des revendications précédentes, caractérisé en ce que la courroie (12, 112) est une courroie crantée et qu'elle est mise en mouvement entre au moins deux roues (14, 16; 114, 116; 114A, 116A).
  12. Appareil selon la revendication 2, caractérisé en ce que les moyens de déchargement comprennent une buse à air (203).
  13. Appareil selon la revendication 2, caractérisé en ce que des moyens pour faire basculer les chutes (211) sont combinés avec le convoyeur (1, 201) pour provoquer le basculement des chutes avant qu'elles n'atteignent la courroie (12).



Fig. 1

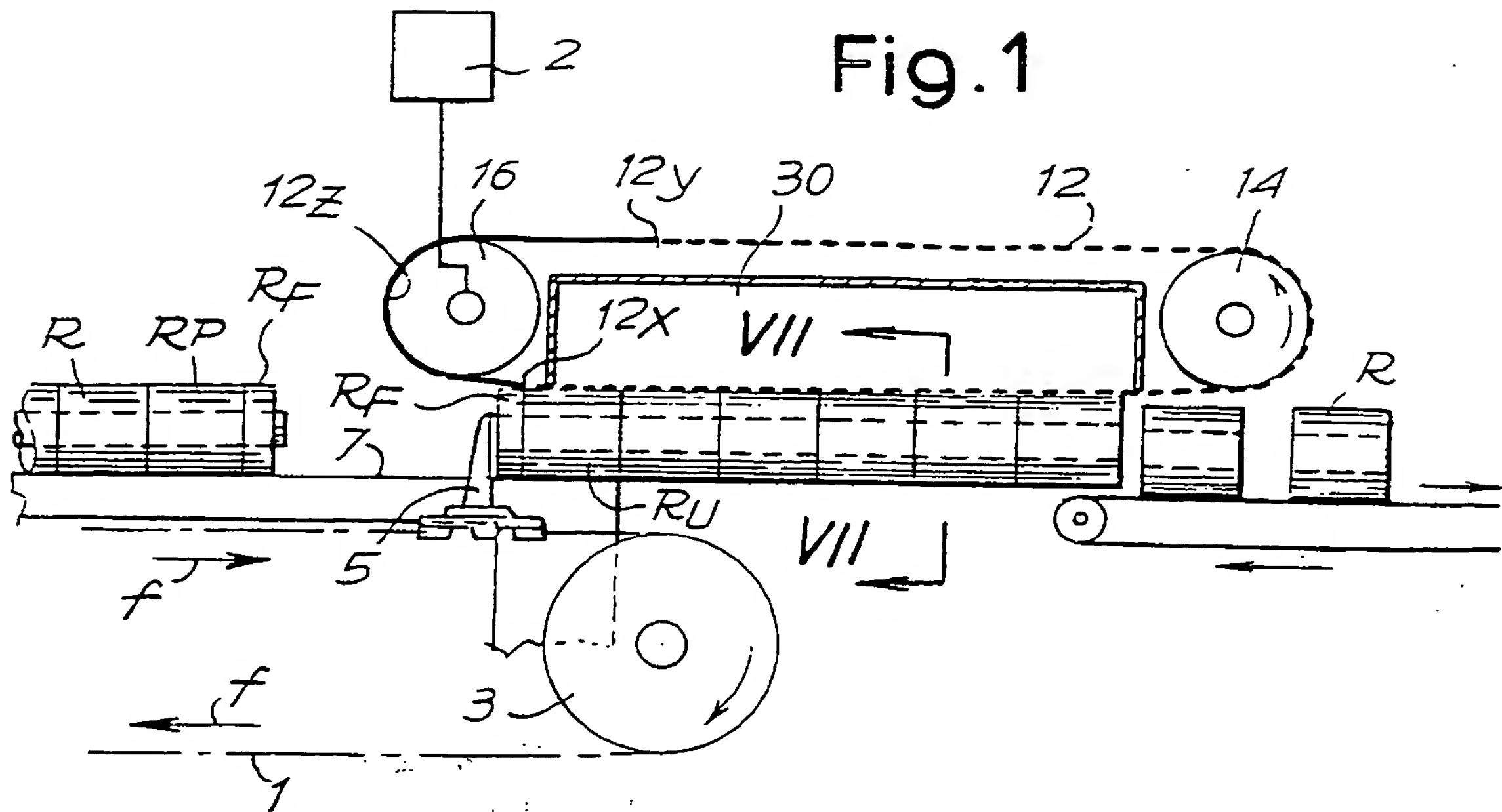


Fig. 2

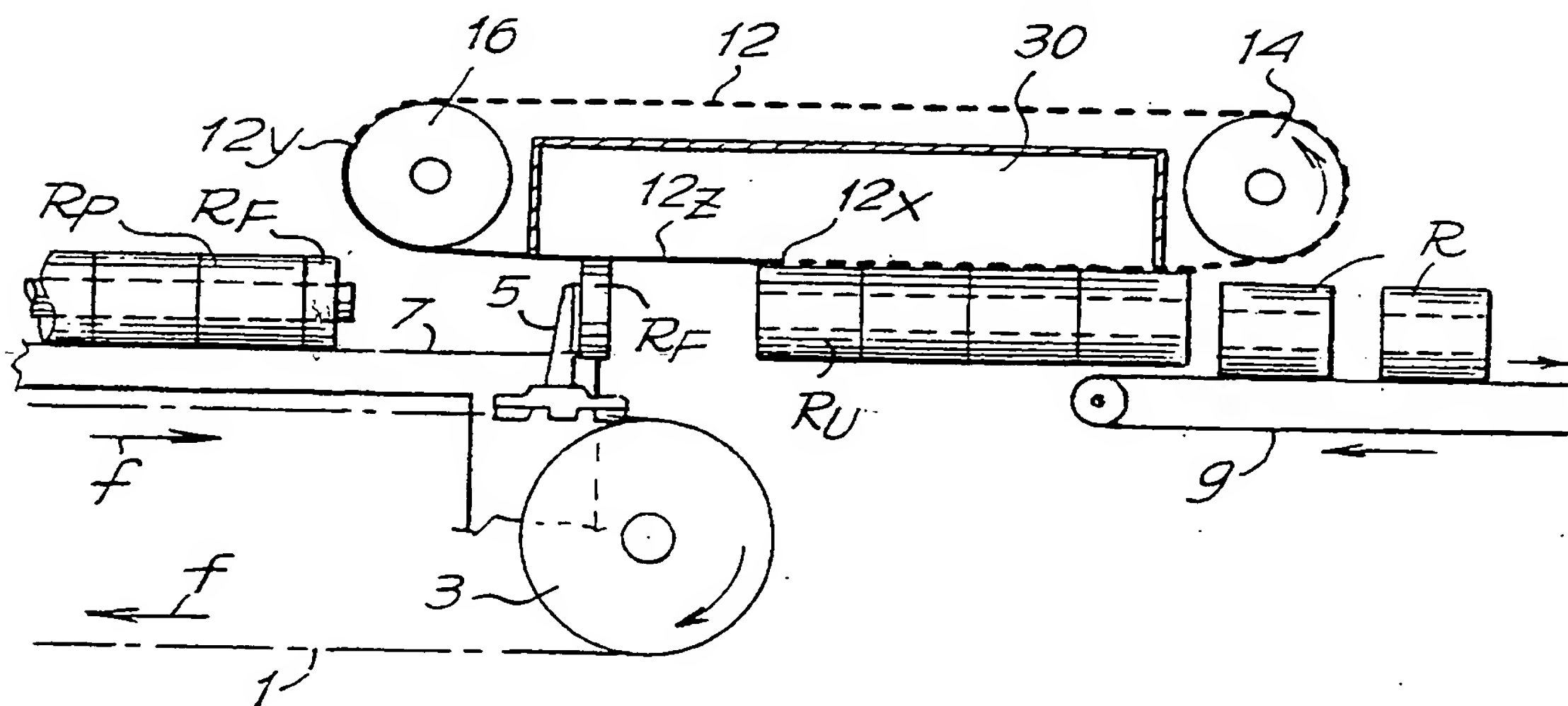


Fig. 3

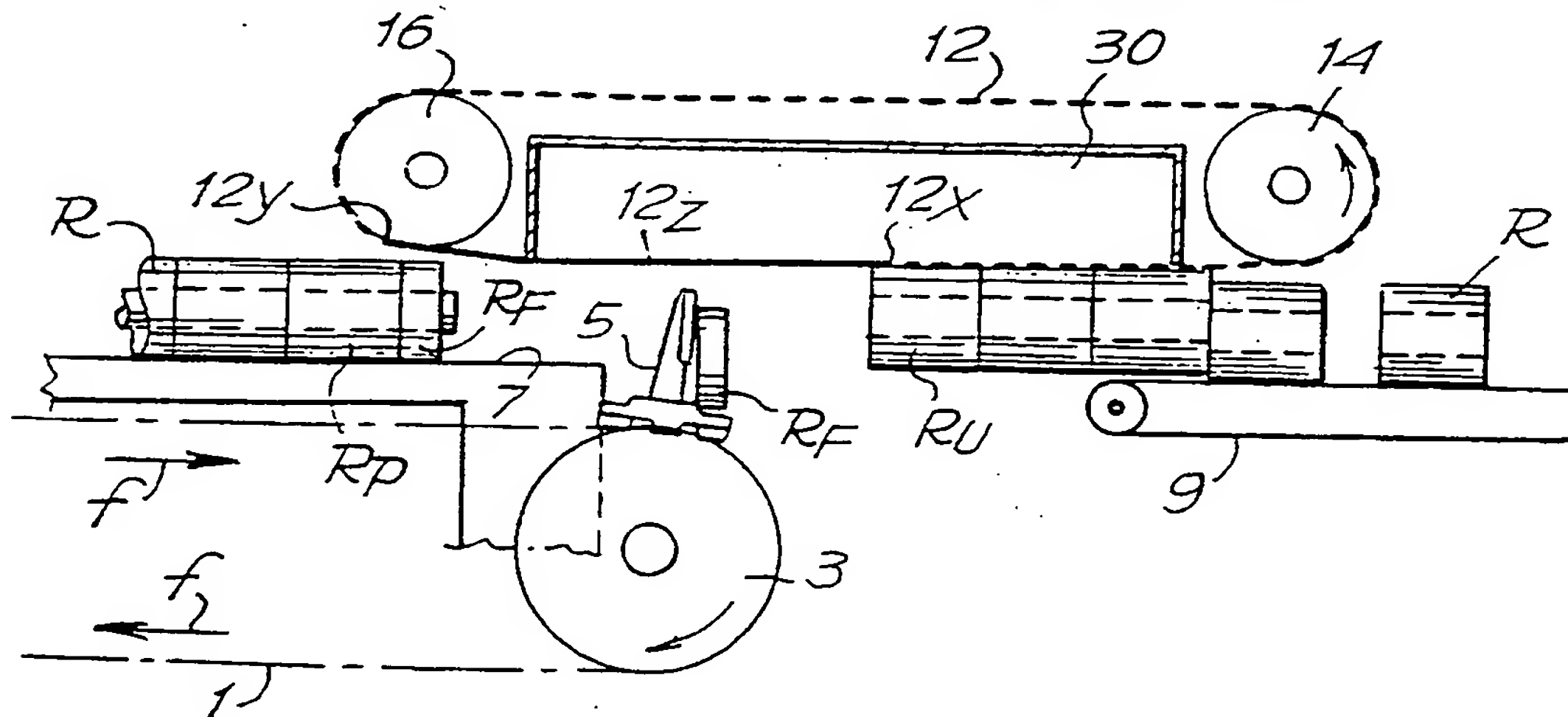


Fig. 4

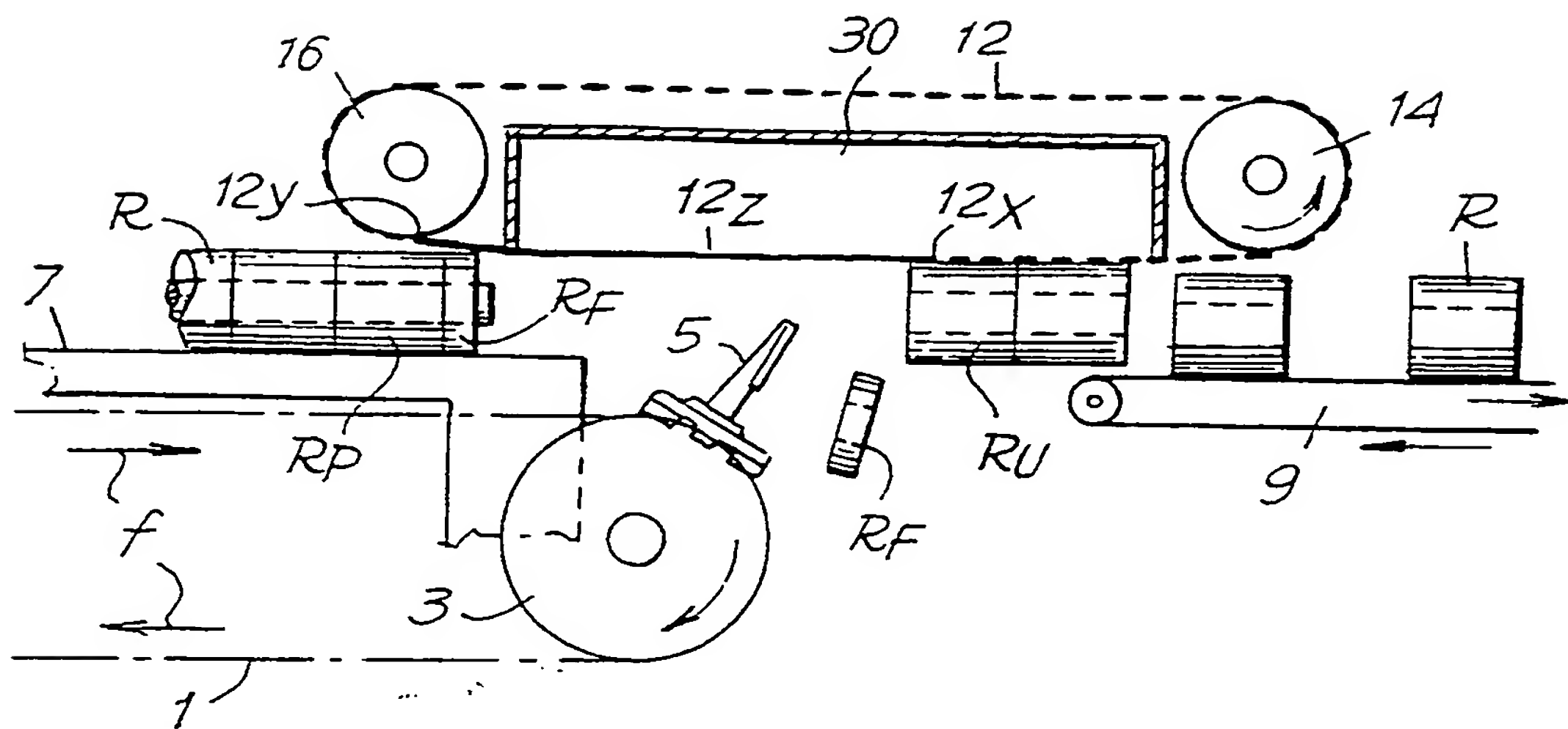


Fig. 5

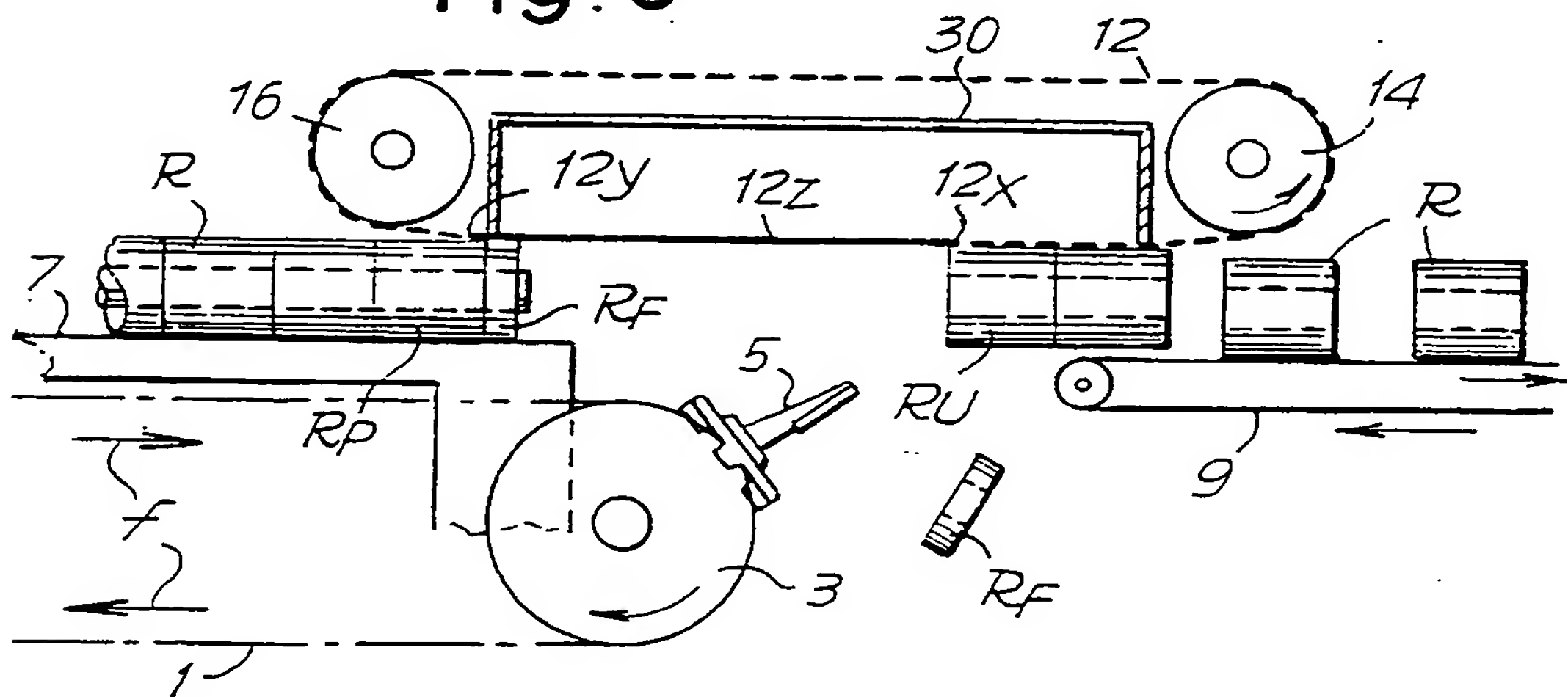


Fig. 6

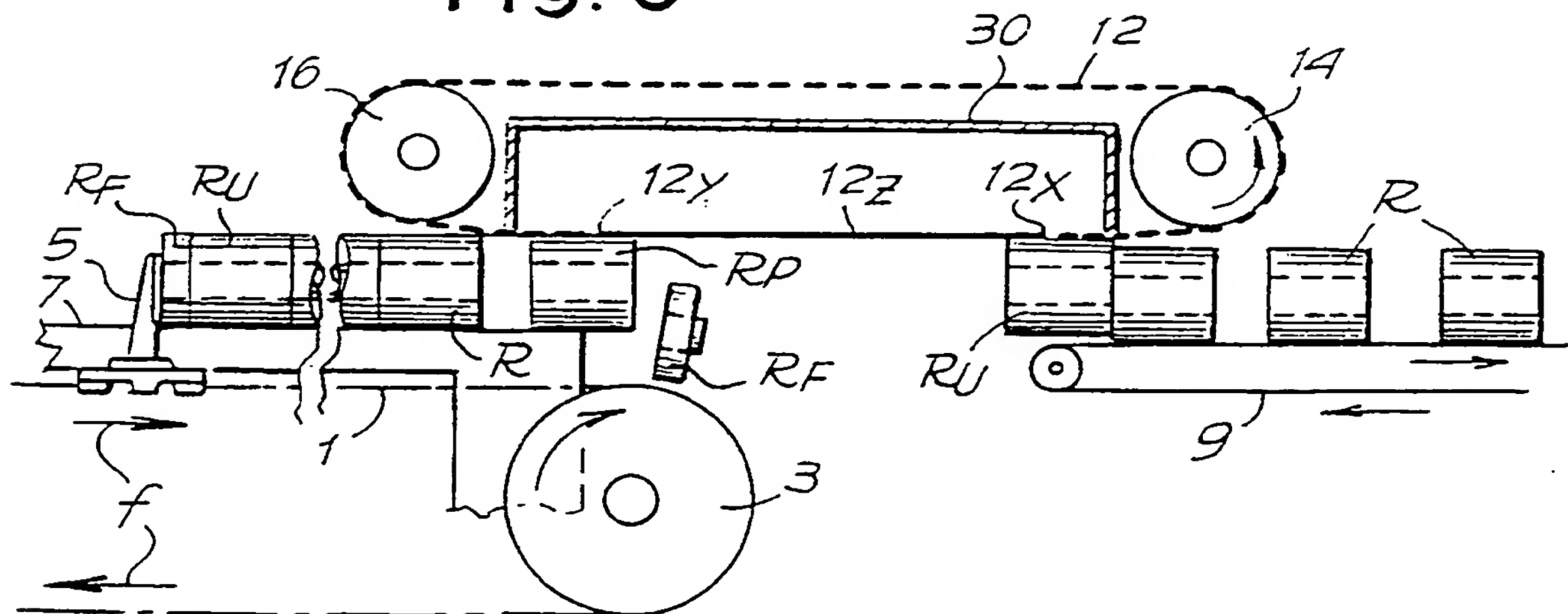


Fig. 7

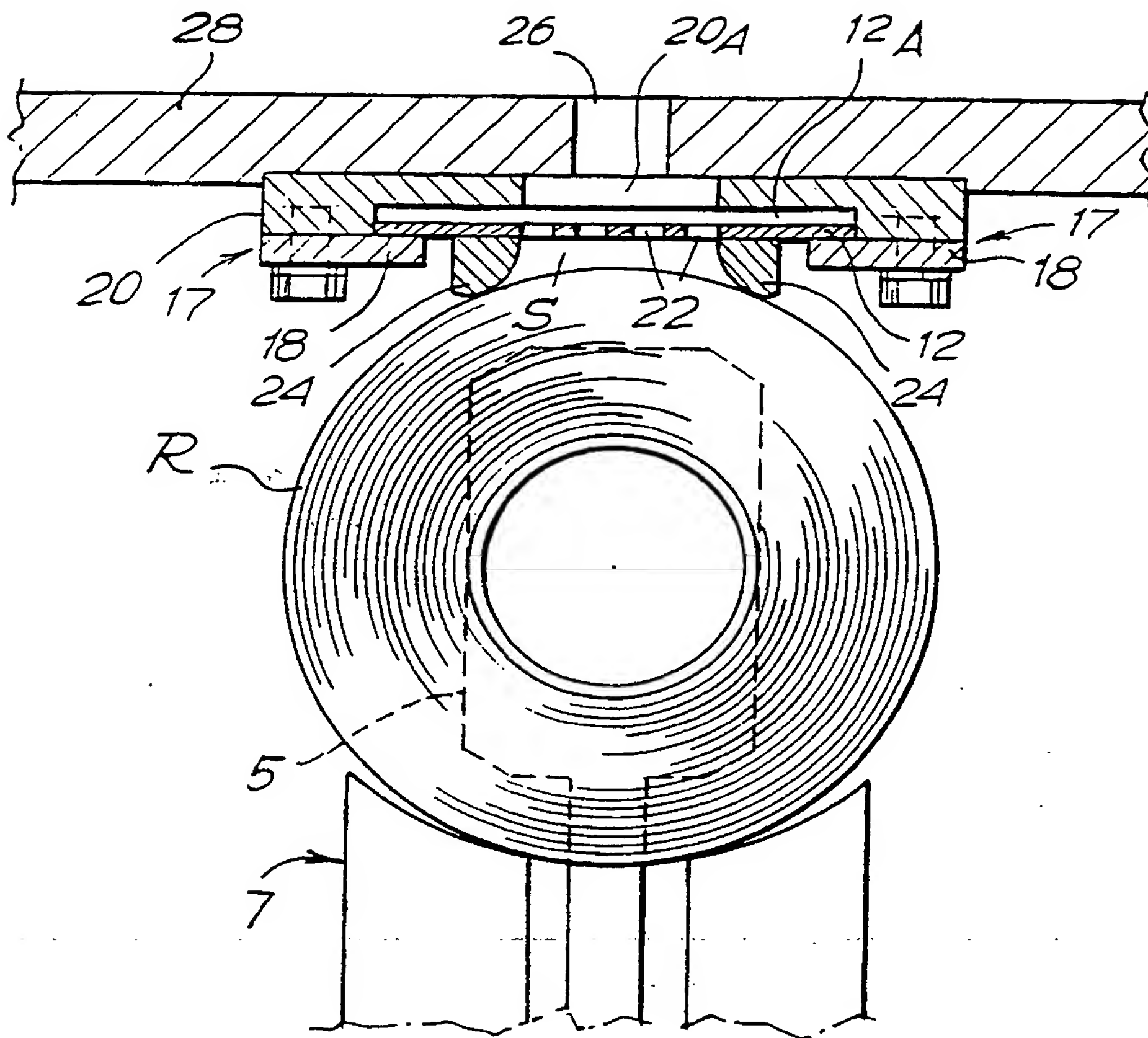


Fig. 8

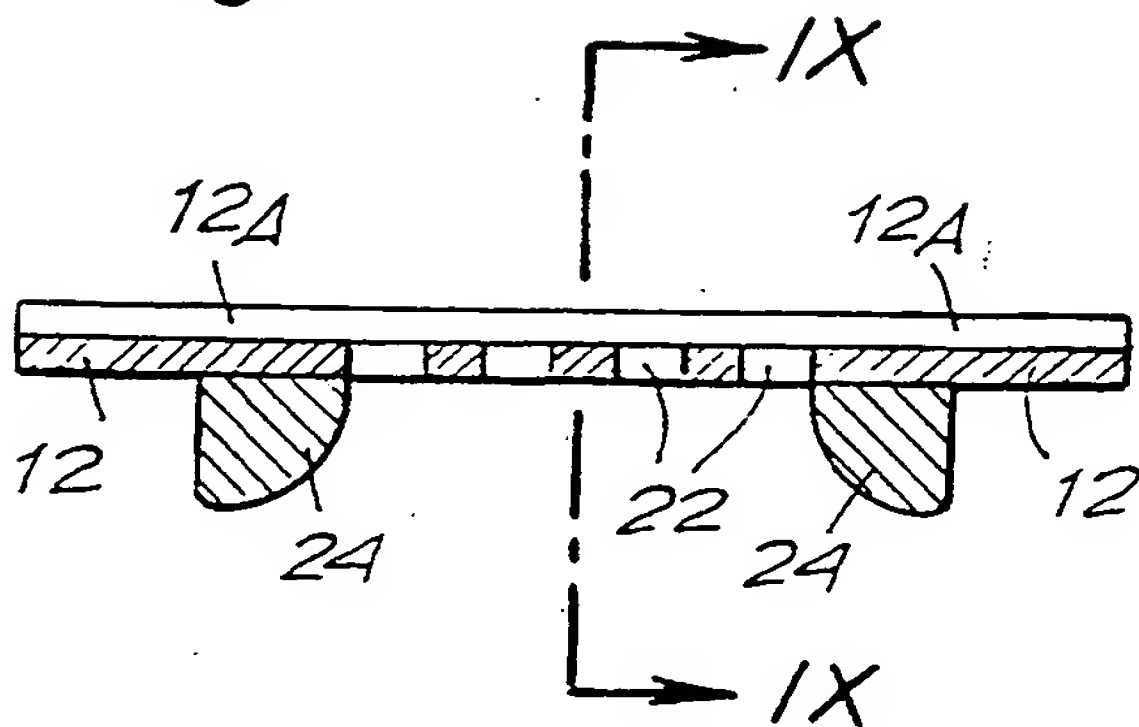
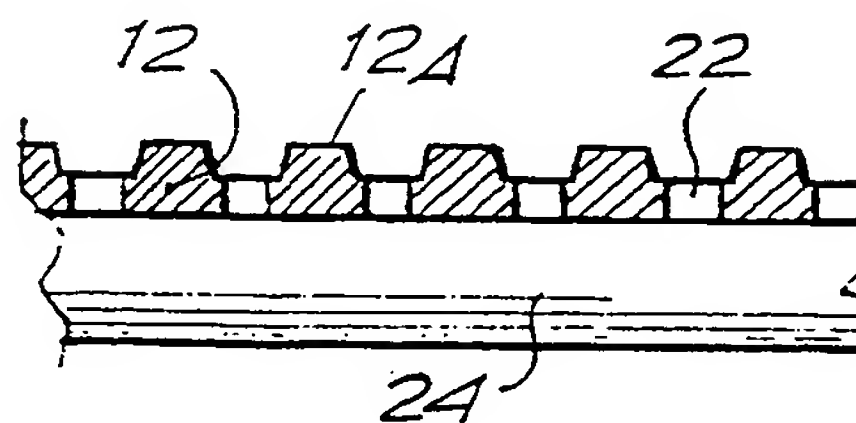


Fig. 9





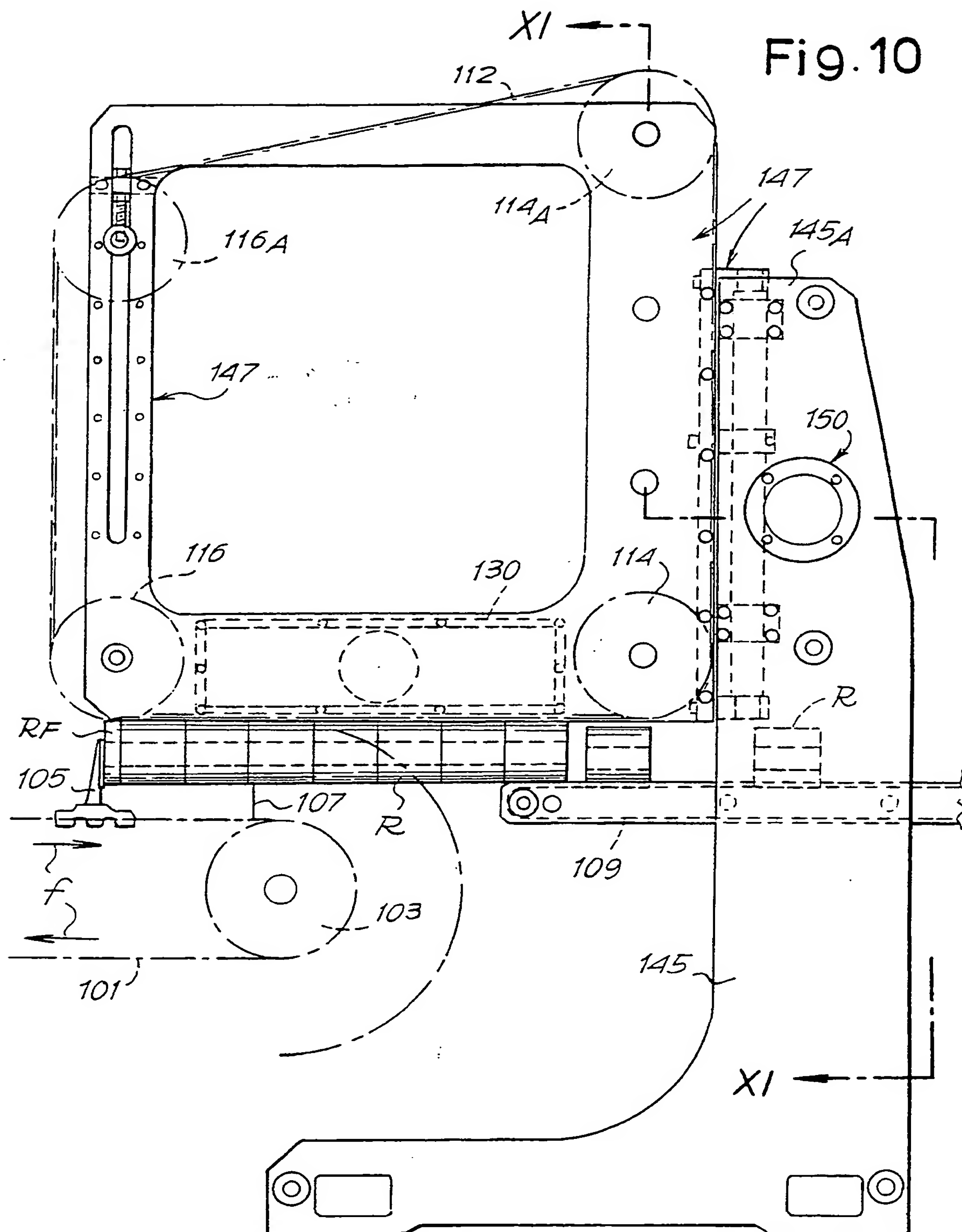


Fig.11

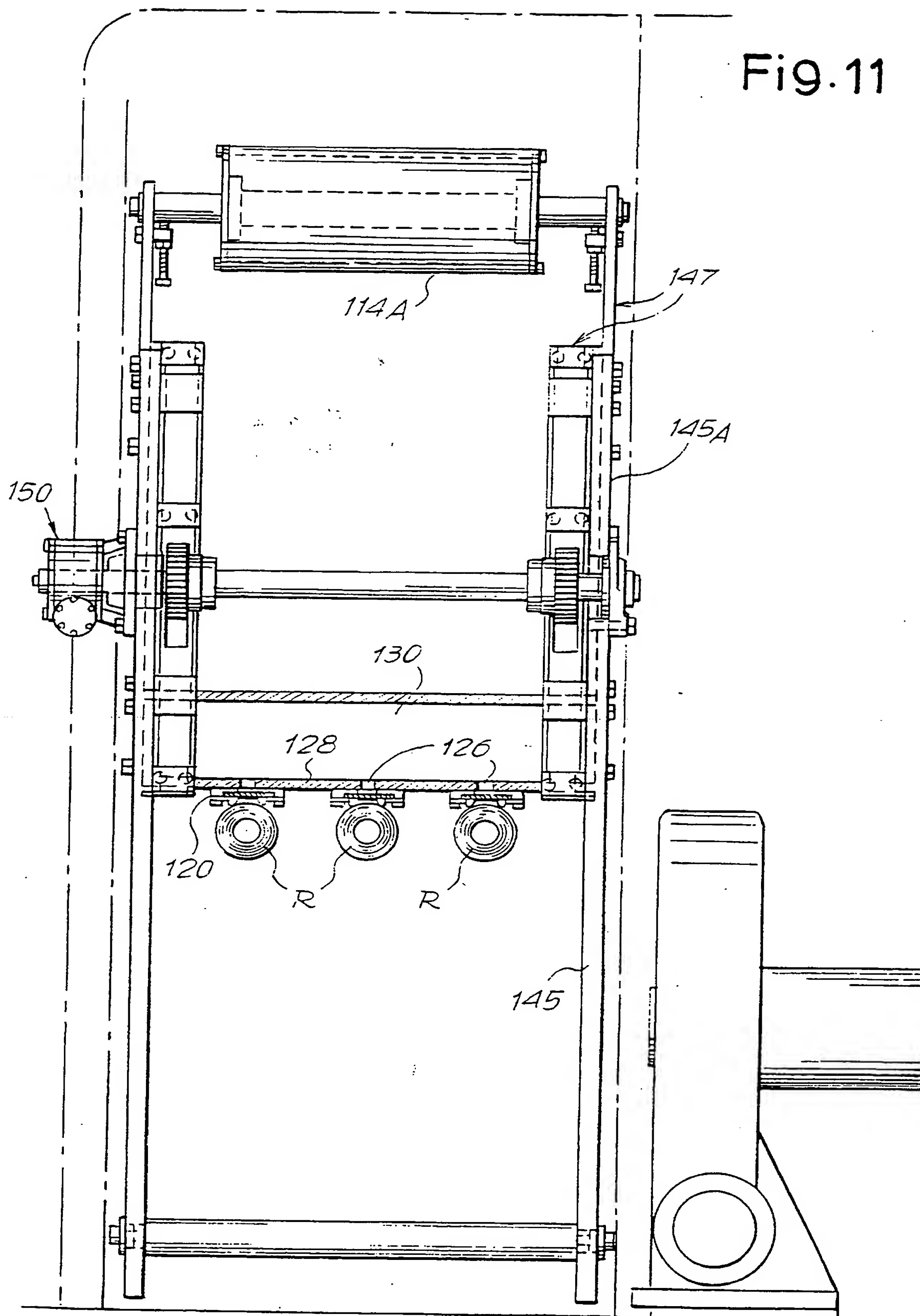
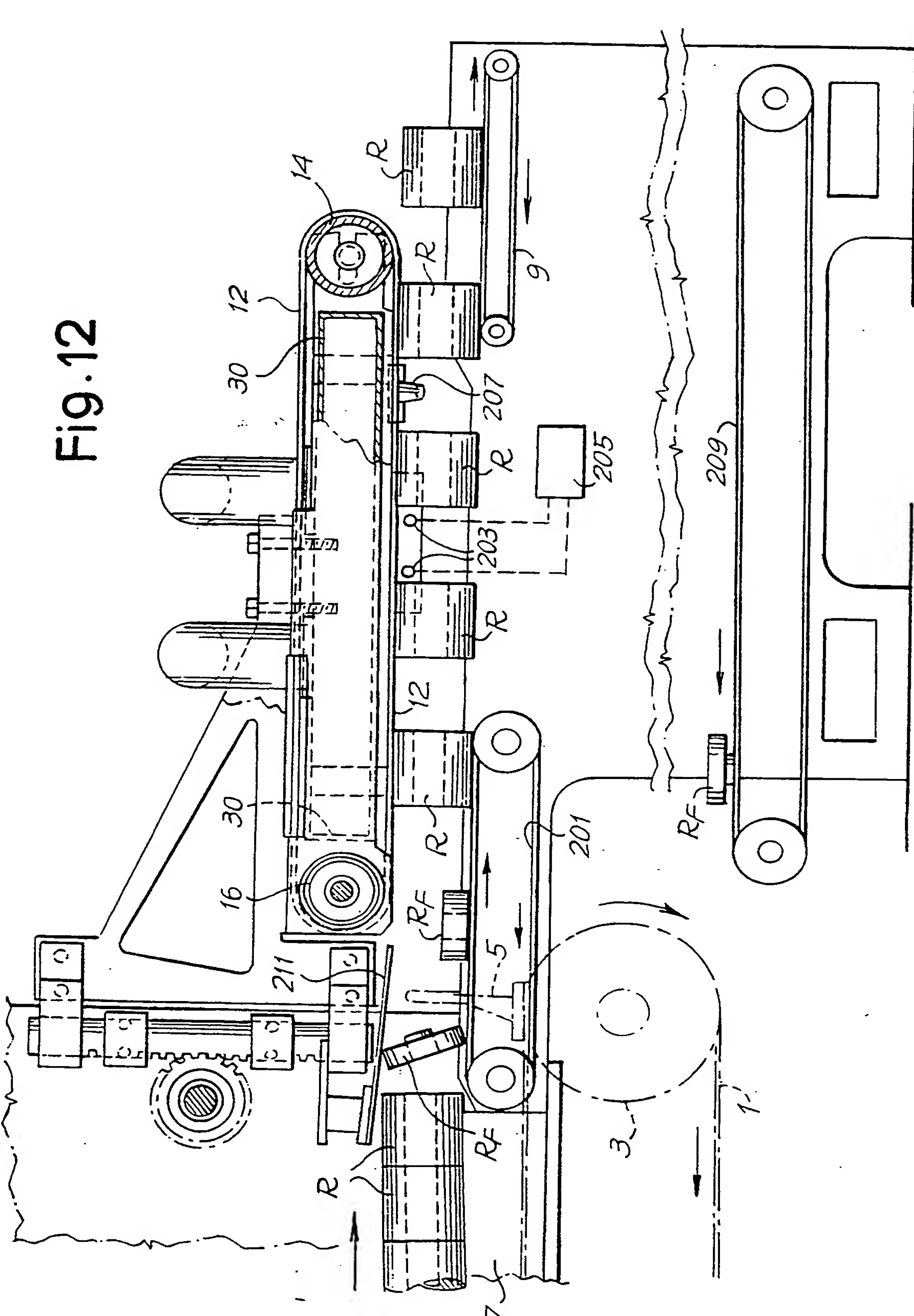


Fig. 12





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